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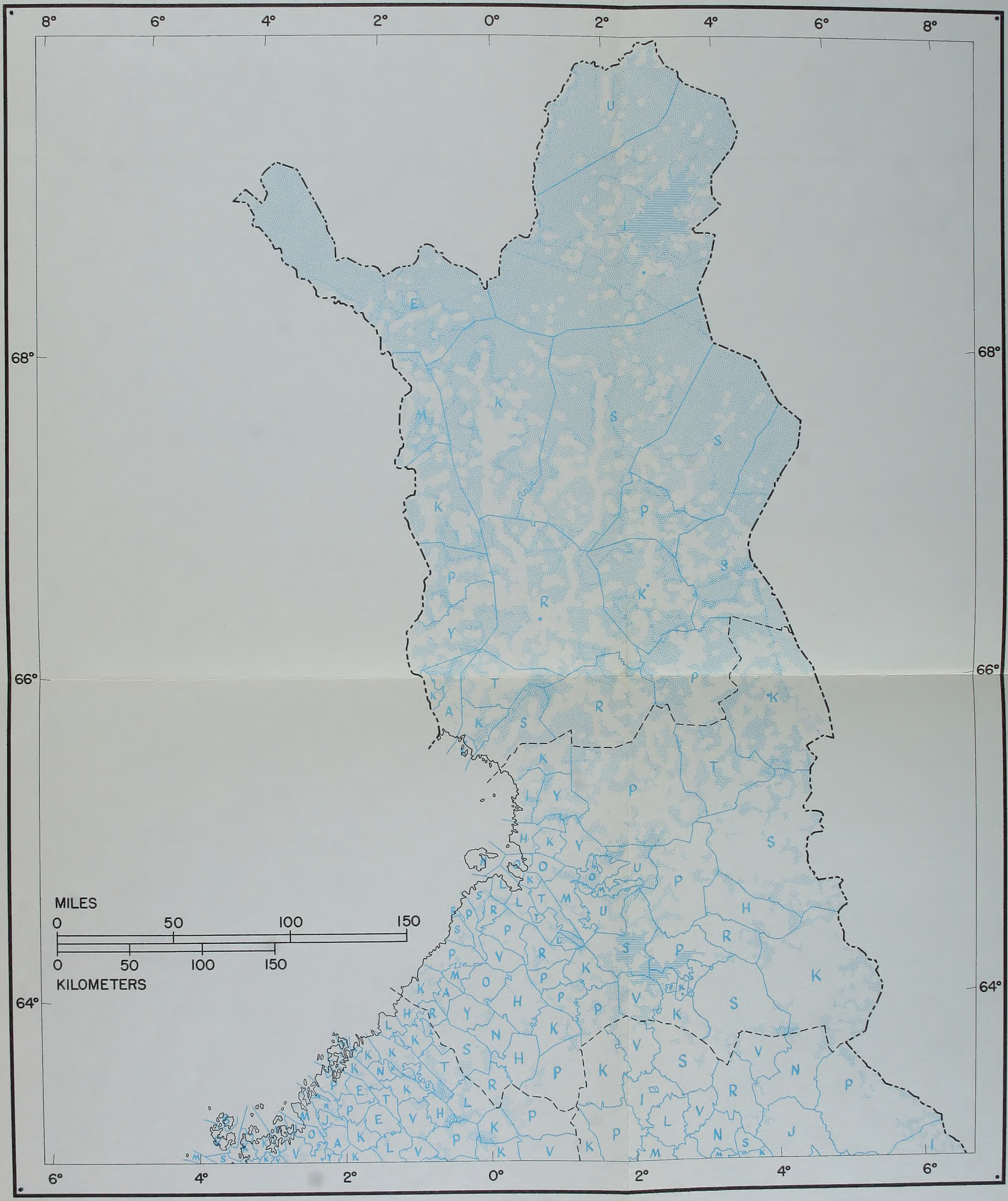

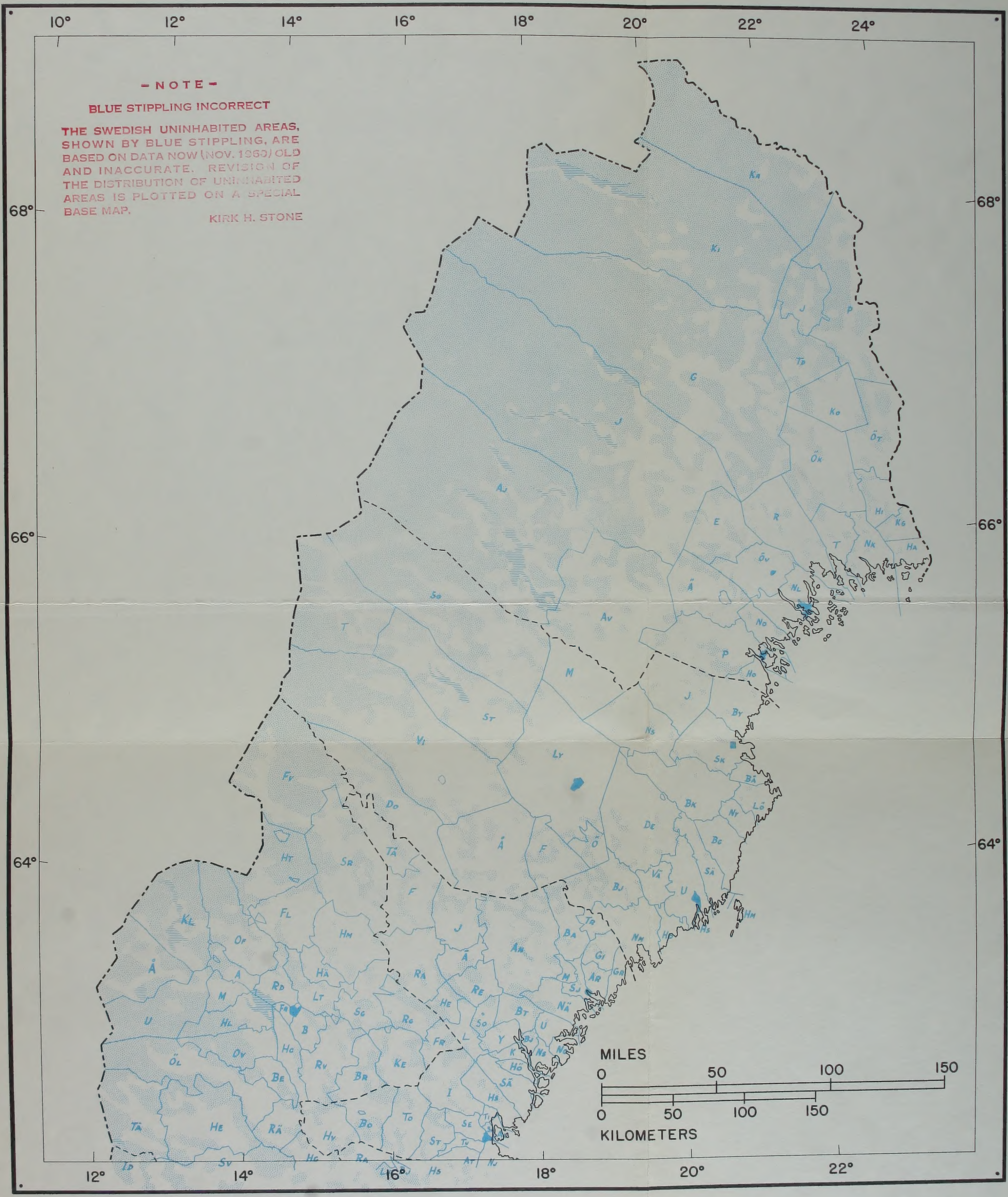

- NOTE -

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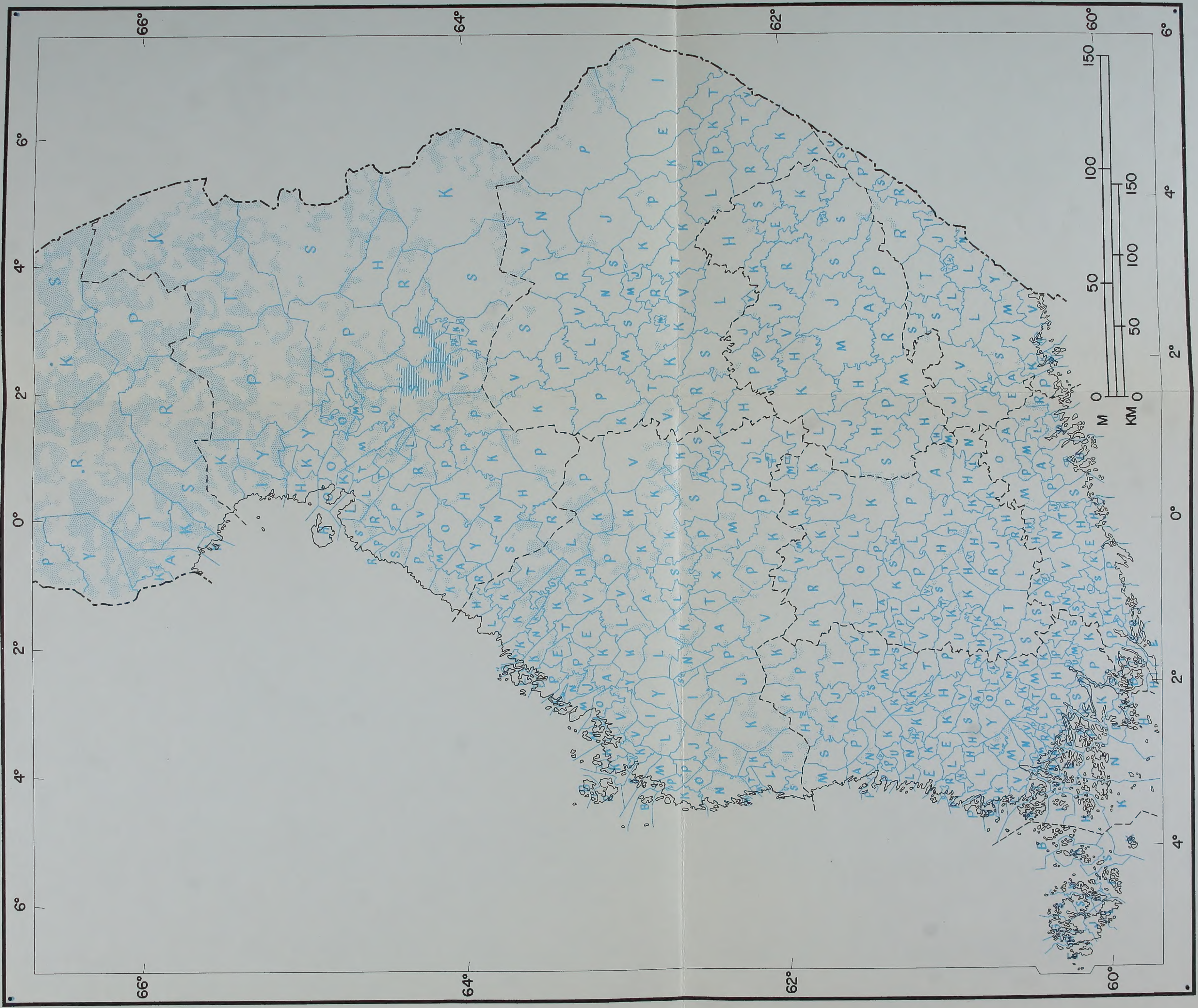
KIRK H. STONE



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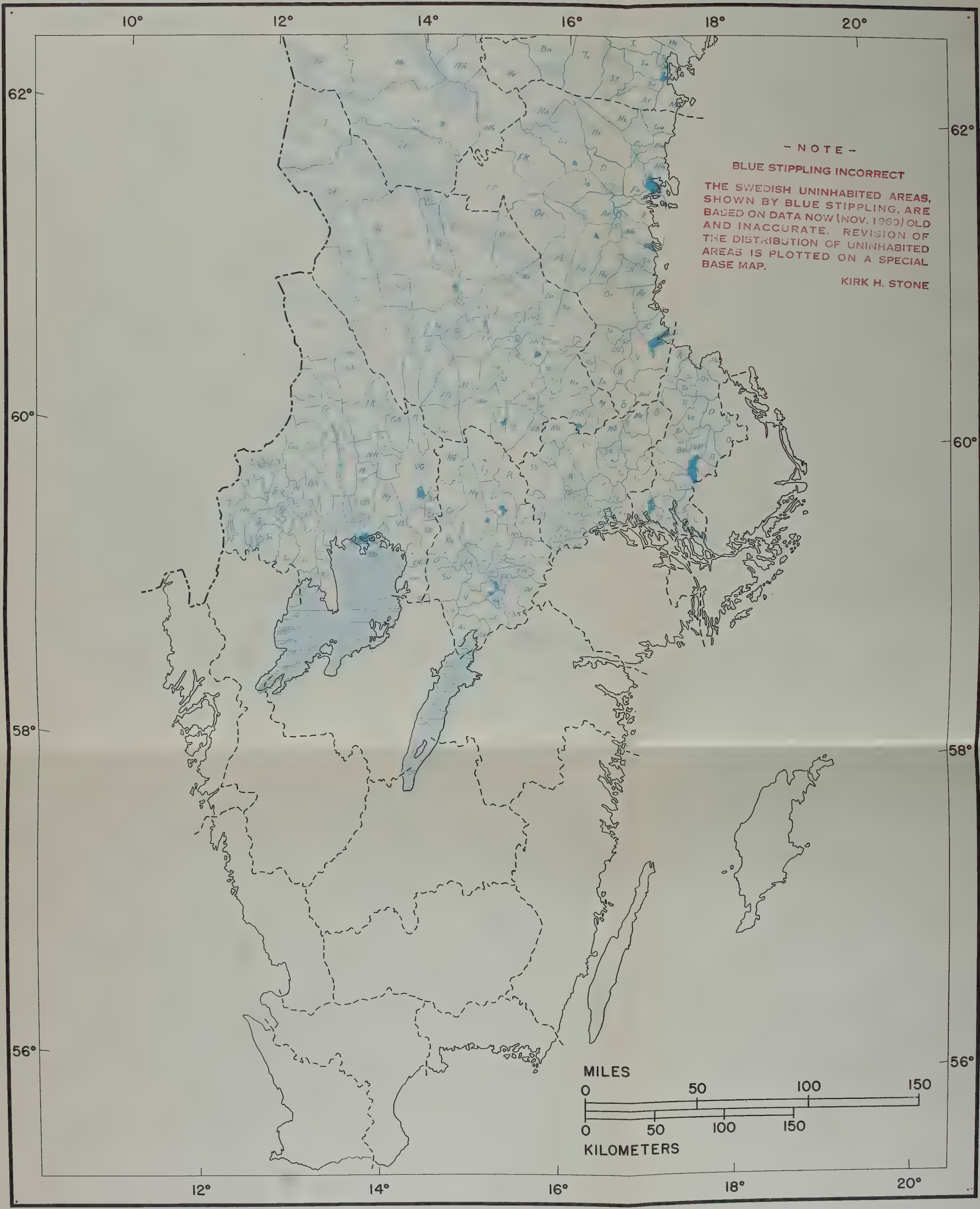

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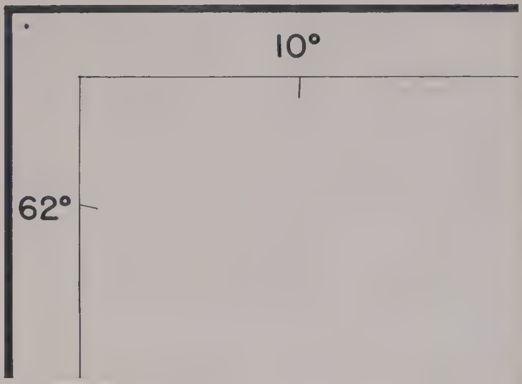

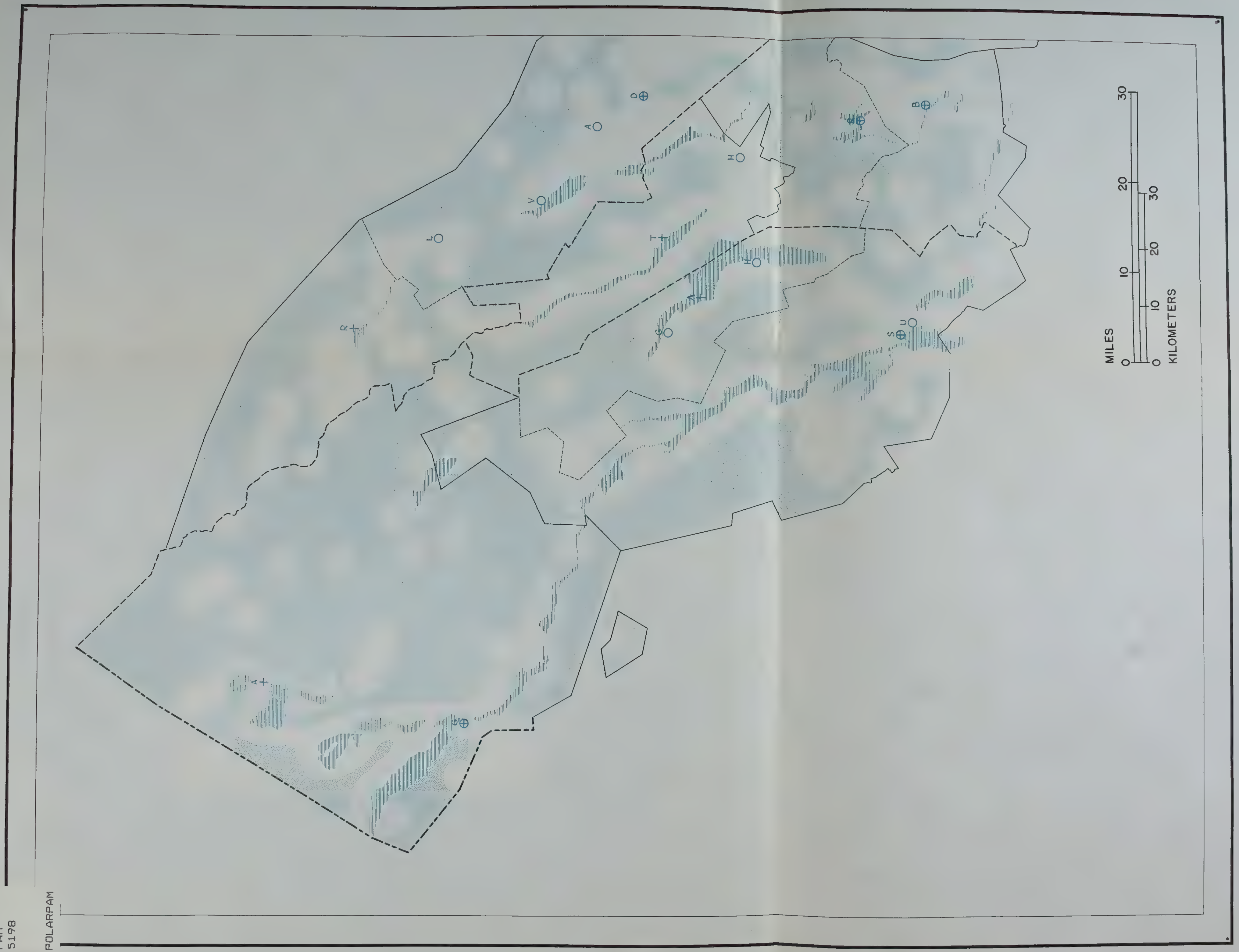

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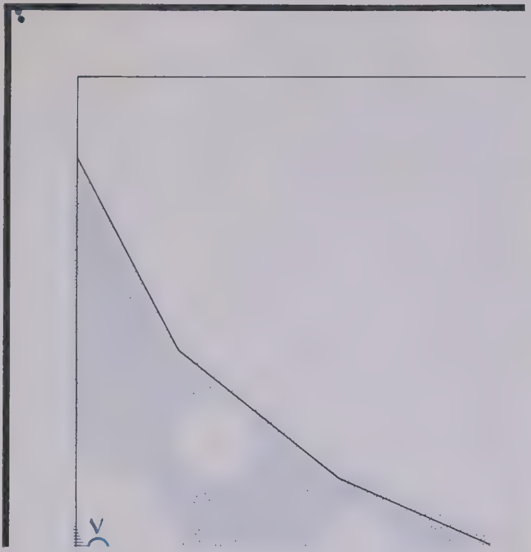

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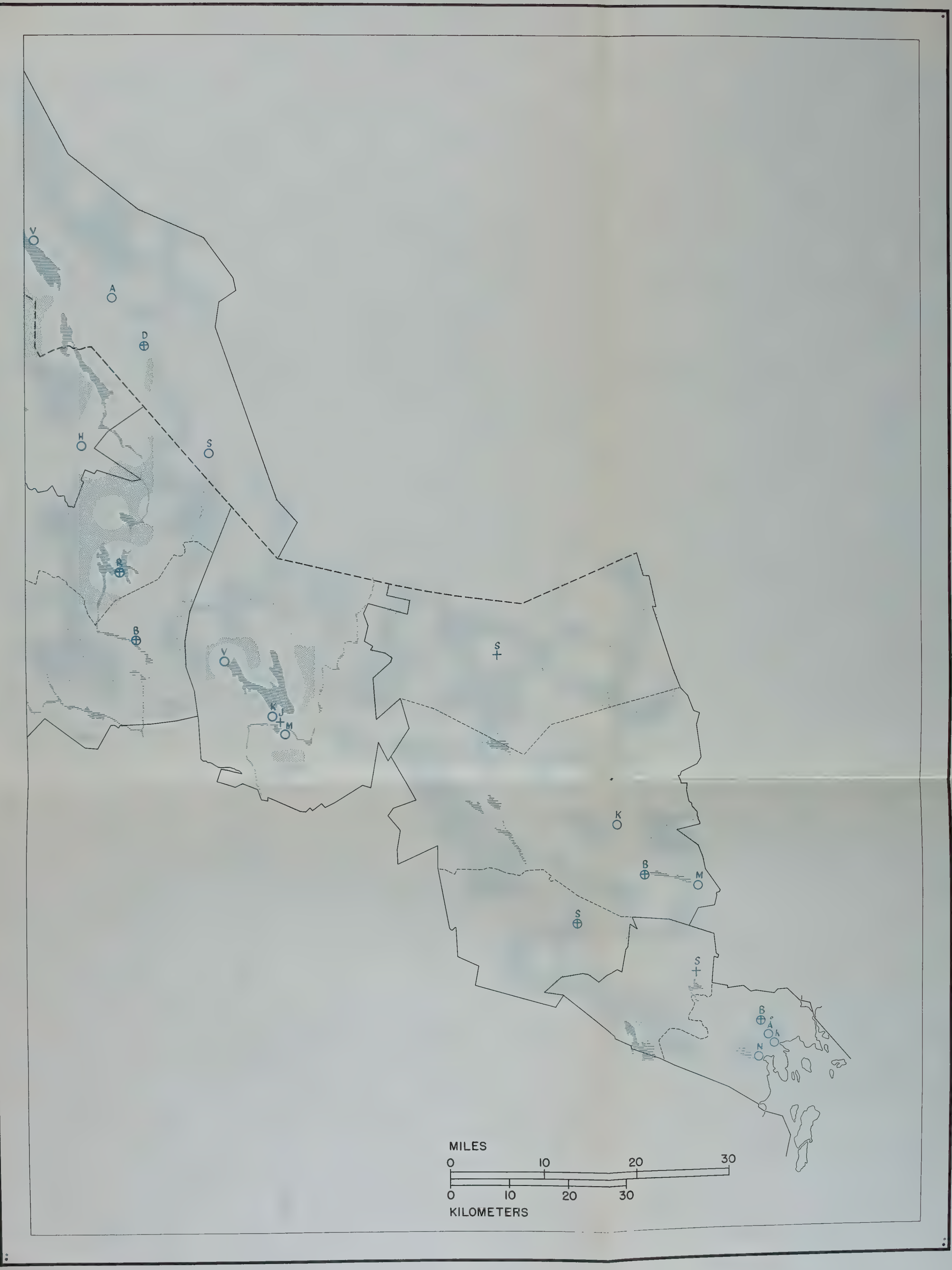
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Annual Report

for

Third Year of Project on

HIGH LATITUDE FRINGES OF SETTLEMENT

U. of Wis. No. NONR-1202(05)

Off. of Nav. Rsch. No. NR 389:127

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To

Geography Branch

Office of Naval Research

Department of the Navy

by

Kirk H. Stone

Professor of Geography

University of Wisconsin

Madison 6, Wisconsin

as of 1 December 1960

A. Research Objectives

This project focuses upon the transfer of settlement experience between roughly similar regions. The principal objective is to determine what settlement experience in Norden (countries of older settlement) may be used in planning for present and additional settlement in northern North America (countries of newer settlement). These data may be obtained by the location, classification, and determination of the characteristics of the fringe of settlement regions in Iceland, Norway, Sweden, Finland, northern Canada, and Alaska. Especial attention is given to the measurement of the degree of permanence of settlement in these areas.

The secondary objectives are to train geographical graduate students in research on the fringes of settlement and to strengthen relations between geographers in Scandinavia and North America.

B. Analyses

1. Formulated Conclusions

a. General. A new fringe of settlement zonal classification has been formulated; it supersedes all others previously reported from this project. The major change is a four-zonal division, instead of three-zonal, to measure the regional and local isolation of inhabited areas within the region of discontinuous settlement; the details are shown in Table 1.

The new fringe of settlement zonal classification is applicable throughout the free-world Northern Lands. Finnish and Swedish zones are shown herein (Fig. 1a and 2). All four zones are found in Norway. Iceland is predominantly Outer Fringe Zone; Canada has thin (north-south) Inner and Middle Fringe Zones and very wide Outer and Outermost Fringe Zones; and Alaska has much Outer Fringe Zone with small islands of Middle Fringe Zone and a large area of Outermost Fringe Zone on the western and northern coasts.

b. Finland. Inhabited land is shown conservatively on the Finnish base maps (see attached examples). The point symbols of permanently occupied residences are converted to areal symbols by drawing circles with radii of 2 1/2 KM (1 1/2 miles) from permanently inhabited residences and considering all land within the circle as inhabited. In northern Sweden and Finland it is customary for farms to be composed of several separate parcels of land. Ownership maps of farms in the Västernorrland strip of Sweden show that 2 1/2 KM is rather short; from data for each farm in five of the Finnish detailed work areas (Fig. 1) we see that the average distance from a farmstead to all parcels of the farm is 5-6 KM (3.0-3.6 miles). Thus, we are using a conservative figure. However, enlargement of the radius of a unit of settlement would move the continuous-discontinuous settlement boundaries northward of present locations where they are observable in the field. Therefore, no change in the radius of a unit of settlement is proposed.

The concept of regions of continuous and discontinuous settlement applies. A region of continuous settlement (CS) is defined as a densely settled or well-developed land in which the 2 1/2-KM circles (noted above) overlap for a sufficiently large area to warrant regional classification. A region of discontinuous settlement (DS) is the fringe of settlement in which the continuity of people occupying the land is interrupted by uninhabited areas. In Norden (the Scandinavian States and Finland) the regions of continuous settlement comprise the southern margins and the remainder is the region of discontinuous settlement. In Finland the

Table 1. Fringe of Settlement Zonal Classification

	Transport			Isolation	
	Railroad[a]	Road[b]	Ship[c]	Regional	Local
(Continuous Settlement Region	4	4	3-4	None	None)
(Unpopulated Region	0	0	0	Generally	Inaccessible)
DISCONTINUOUS SETTLEMENT REGION:					
1. INNER FRINGE ZONE					
a. Inland Type	2	4	0	LOW	LOW
b. Coastal Type	2	2-4	2-4		
2. MIDDLE FRINGE ZONE					
a. Inland Type	0-2	3-4	0	MODERATE	LOW
b. Coastal Type	0	3-4	2-4		
3. OUTER FRINGE ZONE					
a. Inland Type	0	2-3	0	HIGH	MODERATE
b. Coastal Type	0	0-2	1-2		
4. OUTERMOST FRINGE ZONE					
a. Inland Type	0	0-2	0	HIGH	HIGH
b. Coastal Type	0	0	0-2		

---

[a] Railroad transport available in the number of directions indicated within about 15 English miles of most inhabitants.

[b] Road transport available in the number of directions indicated within about 10 English miles of most inhabitants.

[c] Ship transport available in number of three-month units per year within about 25 English miles of most coastal inhabitants.

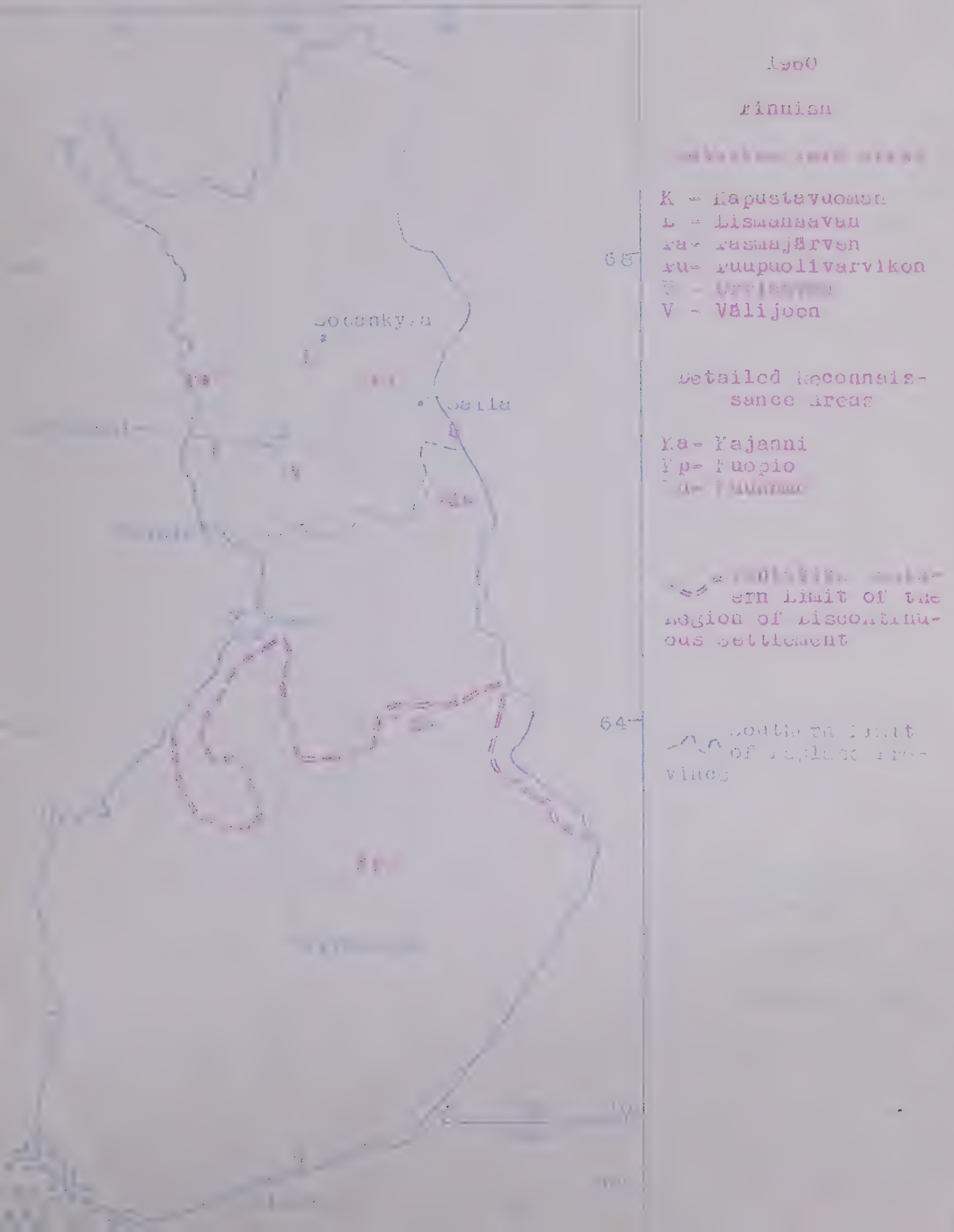
tentative CS/DS boundary shown on Fig. 1 has been revised to the position shown on Fig. 1a.

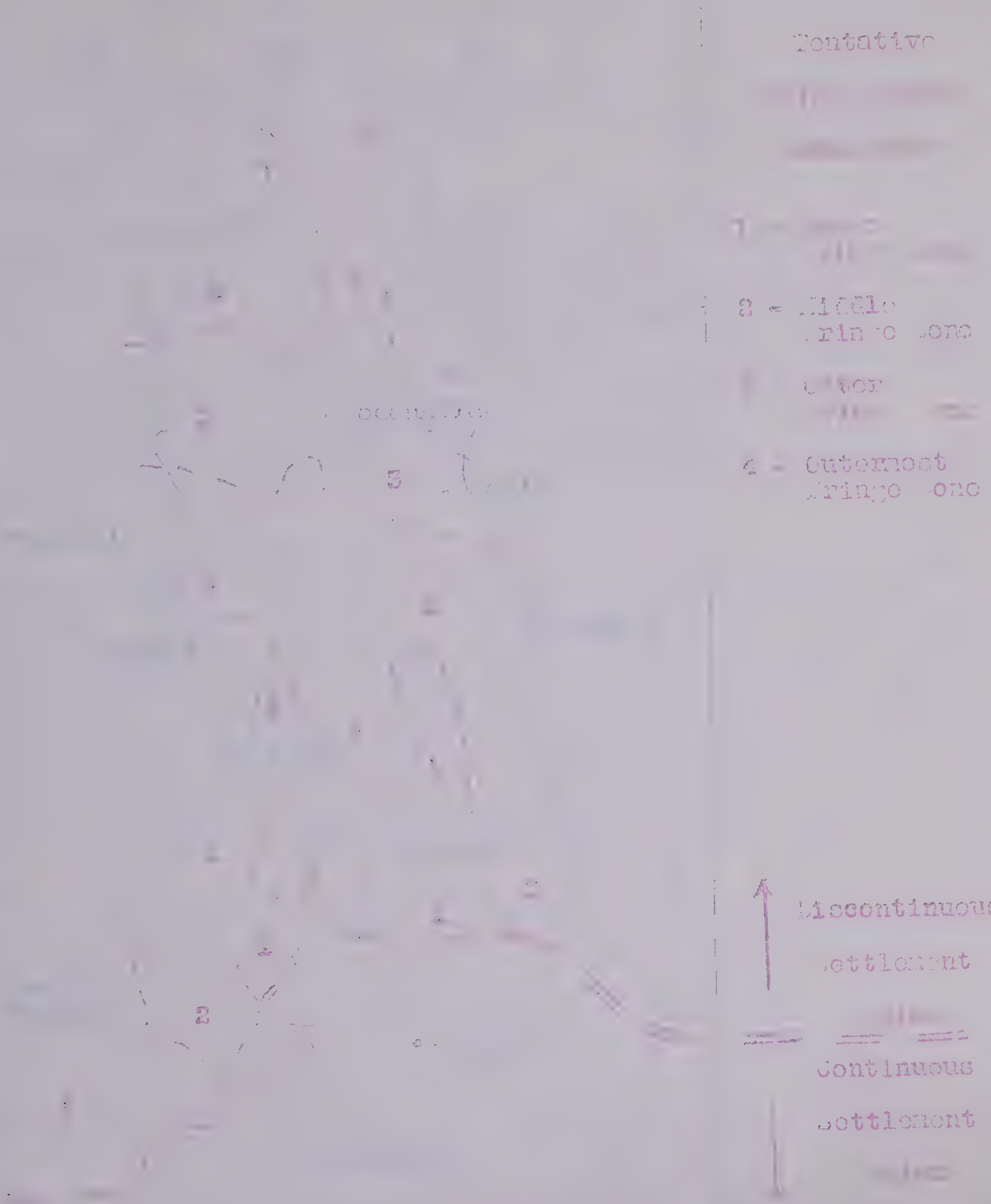
Settler selection activities appear to be incomplete in comparison with those related to selection of the land. Settlers usually are from nearby land so they are familiar with the area in general; however, many colonists lack experience in farming and-or forestry and sub-occupations necessary (e.g., house construction). There seems to be a considerable need for much "human engineering" to balance the care put into the civil, hydraulic, and architectural engineering.

There is a general order of construction and clearing in the colonies. It is usually: 1st year, well dug and lined and sauna (Finnish bath house) and temporary barn built or residence started; 2nd year, residence completed, permanent barn started, and clearing started; 3rd year, continued work on farmstead buildings and clearing continued; 4th year, farmstead buildings completed and cleared land total increased to 7½ - 10 acres.

At least two conclusions with respect to settlement planning are clear from recent Finnish experience. 1) The presence of significant secondary employment possibilities in an area should be disregarded when planning the size of rural farms; farms should not be planned to be small in anticipation of the settlers' part-time employment in the secondary occupations. 2) Primary drainage ditches and main roads should be built at least two years before arrival of the settlers so that there is sufficient time for the formation of heavy-duty transport routes and for initial lowering of the water table before construction and clearing begin.

There are four measures of permanence of settlement in Finnish colonies that appear to be of major significance. They are: 1) local isolation, 2) age structure, 3) off-farm income, and 4) location re existing service centers. Many Finnish colonies are several kilometers from the nearest road; too many colonies are, like Uriaavan (Fig. 1), at the end of a road tributary to an all-ready regionally isolated position on the Finnish road net. Youthfulness of the colonists" children adds to permanence but may reverse itself when the children become older and have to move because only one child can take the parent's farm. The amount of off-farm income in relation to total annual income, especially in an area with a low number of cars and tractors per population unit, is directly related to the degree of permanence; so are the locations of the off-farm work. However, location with respect to existing service centers is not a measure of


1960
Finnish
K - Kapustavuoman
L - Lismanaavan
Pa - Pasmajärven
Pu - Puupuolivaaravikon
V - Välijoen
Detailed Reconnaissance Areas
Ka - Kajanni
Kp - Kuopio
Tentative southern limit of the region of discontinuous settlement
Southern limit of Lapland provinces
68
64
Sodankylä
Salla
Pa
Pu
K
L
V
Ka
Kp


Tentative
3
2
2 - Middle Fringe Zone
3 - Outer Fringe Zone
4 - Outermost Fringe Zone
Discontinuous Settlement
Continuous Settlement

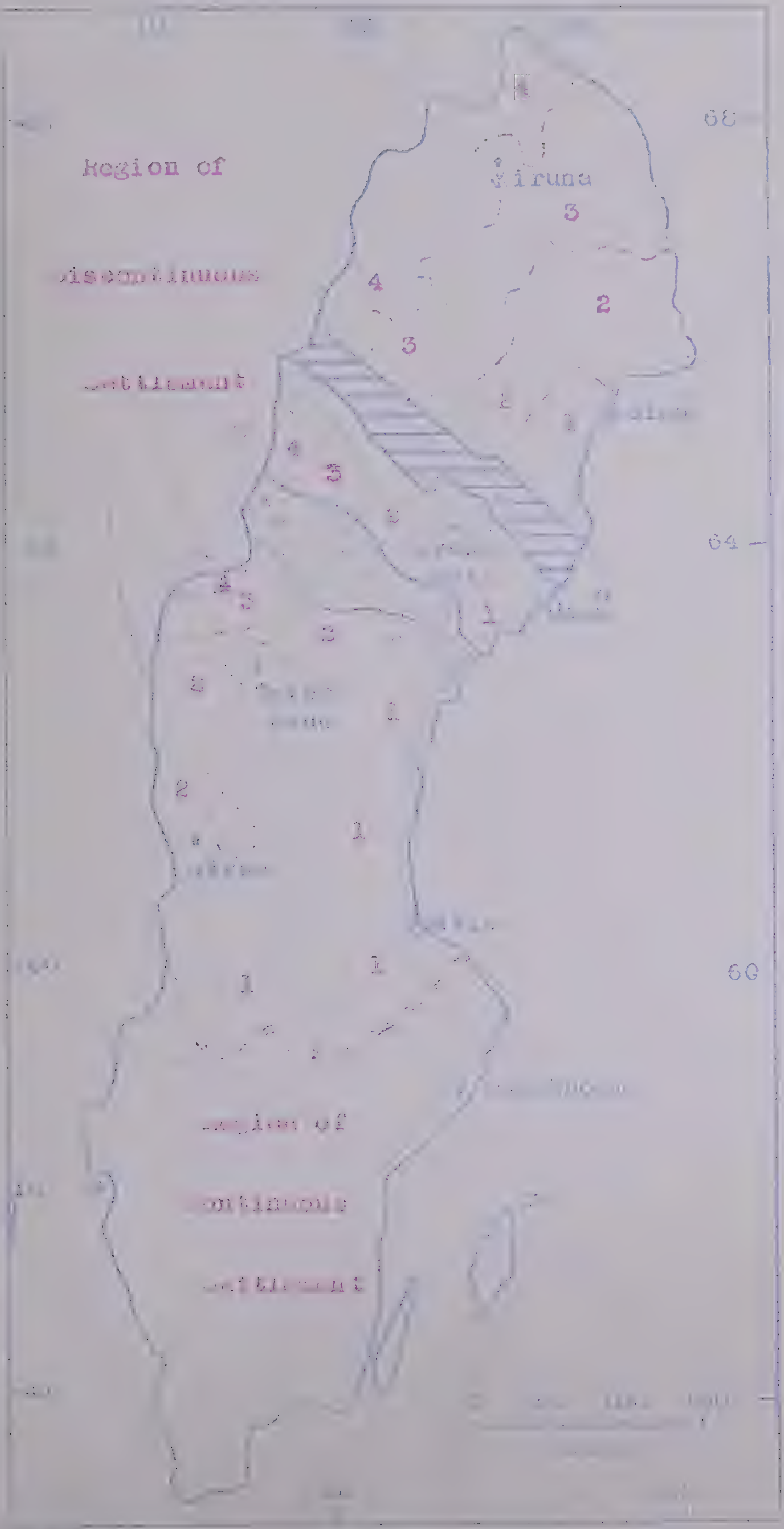
permanence; in the past 2-3 years in Finland traveling bus-stores have been permitted to begin operations farther than 1 KM from existing centers and this is breaking the dependence upon the fixed stores and, therefore, any permanence associated with that dependence.

c. Sweden. Two changes have been made on the Swedish fringe of settlement map as drawn in December 1959. The CS/DS regional border has been redrawn from the position on Fig. 2 to that on Fig. 2a. Repositioning was the result of determining that the uninhabited areas are shown incorrectly, in blue stippling, on all of the printed base maps prepared for the project; all copies of this map are incorrect and the remaining ones are stamped as such. Swedish fringe of settlement zonal boundaries also have been redrawn; the use of the four-zonal system and dropping the unpopulated region classification presents the facts of isolation there more accurately and completely (Fig. 2).

Migration and abandonment of settlement in the Västernorrland sample strip (Fig. 2) may be generalized in at least four ways. Migration from and towards the outermost fringe zone is primarily by a series of short moves of as little as 25 miles rather than single, long moves. The areal concept applied to abandonment and migration through this project has proved useful to Swedish agricultural administrators. There is a larger number of abandoned settlements in the coastal district but the larger individual abandoned hamlets are inland at sites with much local isolation. Small settlements which have been founded more recently have been abandoned in greater numbers than larger hamlets founded at any time.

Abandonment in the Västerbotten sample strip (Fig. 2) may be summarized in at least five ways. Rural population is tending to withdraw gradually from more isolated areas and to concentrate in certain less isolated spots. Abandonment of places without roads was nearly complete in the 1930s. Abandonment is scattered throughout the strip without concentrations in zones. The largest recently and currently abandoned sites are those where hydroelectric development has taken place or is in progress or where there were former government-sponsored colonies established in the 1920s and 1930s. Abandonment in the larger hamlets has led to farm consolidation whereas that in the smaller places often has led to complete abandonment.

Throughout northern Sweden there is a great difference in the potential mobility of people. Those who have moved relatively great distances to come to the area are more likely to move short or long distances than local persons who have



Detailed Work Areas

1960

▤ Västerbotten Sample Strip

1959

☐ [illegible] Sample Strip

Swedish

Fringe of Settlement

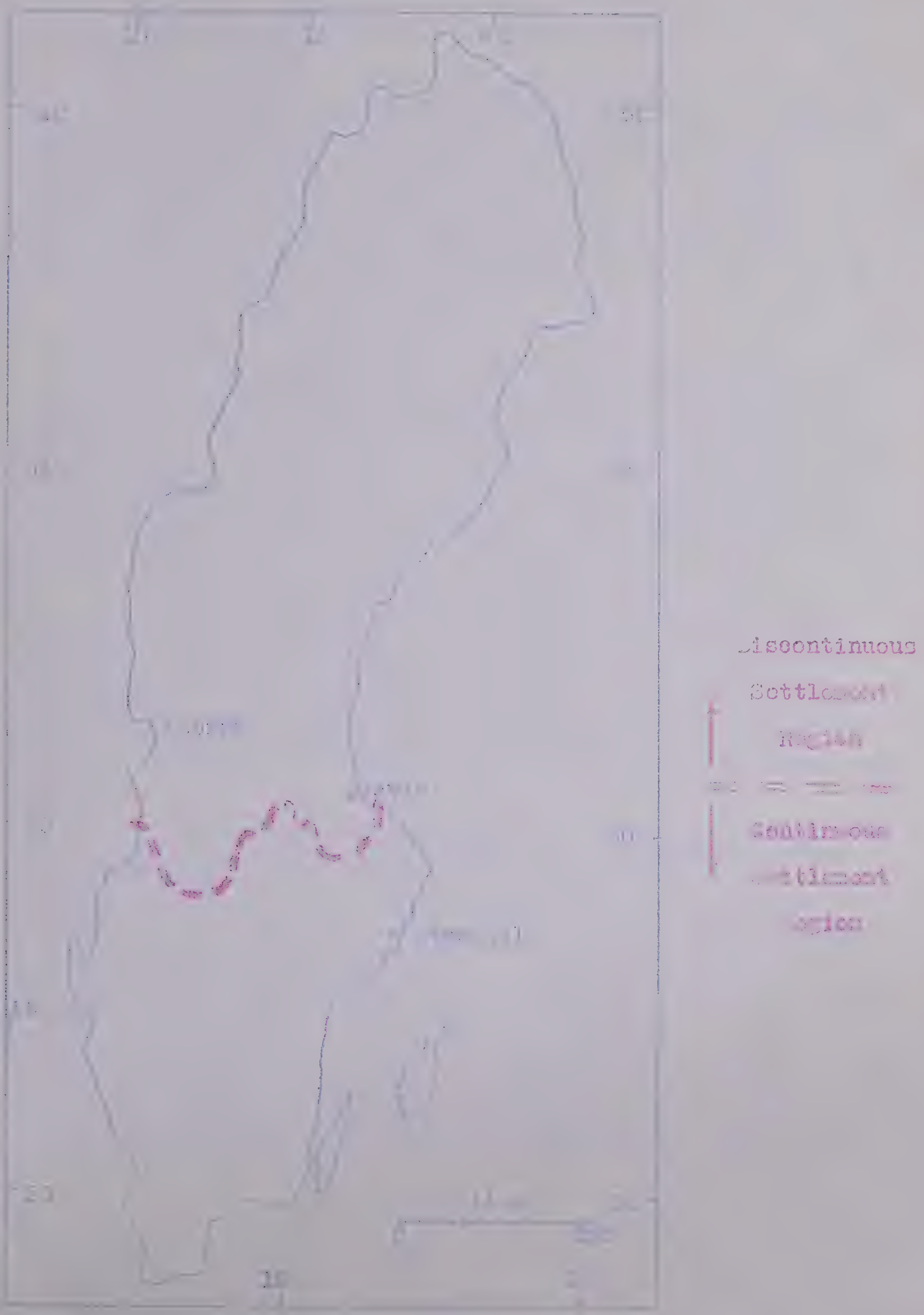
Codes

1 = Inner Fringe

2 = Middle Fringe

3 = Outer Fringe

4 = Outermost Fringe


Discontinuous
Settlement
Region
Continuous
Settlement
Region

moved only a short distance to a new residence or who have not changed positions at all.

d. Canada. Many general beliefs about the mobility of the Canadian agricultural fringe need revision. In general, the Canadian Prairie Province fringe between 1941 and 1951 was characterized by local advance with spots of strong to weak stability (meaning no motion of the line). For the most part, a fringe zone 20-50 miles wide is backed by an area of local and regional retreat extending to the U.S. border. Some of the areas of local advance in 1941-51 had changed by 1959 and 1960 to weak stability or local retreat.

2. Tentative Conclusions

a. Finland. The discontinuous settlement region is divisible into four fringe of settlement zones (Fig. 1a). These are comparable to the zones in northern Sweden (Table 1 and Fig. 2). However, the general distributional pattern is different in Finland in that there is no Inner Fringe Zone in the southeastern corner of the DS region and there are two enclaves of Middle Fringe Zone in the Inner Fringe Zone. In northern Finland the boundary between the Middle and Outer Fringe Zones is less sharply defined than in Sweden.

Finnish colonization is likely to continue along present lines for several years. Finland has gone through three phases of colonization in the past 15 years and the last only began Jan. 1, 1959. There are still available many people of the type settled up to the present and there is much land similar to that now being colonized; barring drastic changes in governmental philosophy or economic ability we may expect colonization to continue in the immediate future.

Current Finnish encouragement of colonization is debatable economically and politically. Principal economic issues are the removal of forest land from production of an item which is one of the main present and long-run sources of income for Finland, and the uneconomic base of milk production in areas with such high regional and local isolation that subsidies are required to maintain production. The political issues are to relieve unemployment, provide farms for a slowly increasing population which has people who want to farm, and to populate areas adjacent to the Soviet Union (although seldom admitted that a "buffer" zone is being created). A basic problem of colonization is the increased production of milk and, therefore, increased dependence upon the world market for milk and milk products; this market already has a surplus of butter fat so that Finland's trend toward increased

dependence upon milk and milk products appears to be a shaky basis for colonization as well as for the country's economy.

Overall planning is generally complete; the ease with which specific plans may be changed is good (unlike the Norwegian rigidity) and the provision of local agricultural guidance, as in Norway, is most helpful. However, there appears to be too little planning on both the temporary and permanent means of breaking both local and regional isolation in conjunction with a specific colony.

The five-year introductory period, when the state holds ownership, is often too short. Regular daily production of milk for dairy pickup usually is not reached until the fifth or sixth year; income from the cutting of privately owned forests, as well as loans and subsidies for "cold" (new) farms and clearing, provide money for living during the introductory period.

New settlement colonies are located primarily by the soil and drainage qualities of land available. Precolonization inventories of types of soil and drainage are required by law. Individual farm locations are based on soil, drainage, and forest qualities. Within each farm the usual locations are: hay on drained swampland, grain (usually barley) on the lower slopes of glacial till (cleared of forest), and the farmstead on the up-slope side of the break from the slopes to the flat swampland.

b. Sweden. Agricultural subsidies are provided in such a way, in northern Sweden at least, that some farmers develop their farms to the point of being nearly economically sound and then stop. They do not continue for fear of becoming ineligible for subsidies; many farms in northern Sweden could not continue operating if it were not for the subsidies.

3. Significant Unsolved Problems.

Several problems have arisen during the course of the project. Selected significant ones are listed to indicate what is needed now to accomplish the project's immediate objectives:

What are the average maxima and minima of the effective economic limits of a railroad? of a road? of a shipping route?

In the fringe zone classification, what are the points of critical difference in: passenger versus freight traffic on railroads and roads, frequency of trains on railroads and of

buses on roads, the size and frequency of uninhabited areas, and in the crossing of uninhabited areas by public transportation lines?

What types of locational analyses should be added to present Finnish pre-colonization study?

Are the measures of agricultural fringe mobility (changes in rural population, farm acreage, cultivated land acreage) applied in the Canadian Prairie Provinces suitable for use in Norden?

C. Cartography and Photography

1. Corrected Maps.

Uninhabited areas are shown incorrectly on the project's Swedish base maps printed in the fall of 1959. A notation to this effect is stamped on all remaining copies (see attached); PREVIOUSLY ISSUED COPIES SHOULD BE DESTROYED. Correction of the southern sheet is complete while that of the northern sheet is in progress. It is this correction that prompted repositioning of the Swedish DS/CS boundary mentioned in B 1 c above and shown on Fig. 2a.

2. Completed Maps

The project's base maps of Finland have been printed (see attached). These are two sheets, about 1-2 million scale, with country and provincial boundaries in black, commune boundaries and the initial letters of their names in blue, and unsettled areas (land farther than 2 1-2 KM from the nearest permanently inhabited residence) in blue stippling. It has been a major phase of the project to produce such maps for Norway, Sweden, and Finland; these may be matched together to form a single map of the Norden peninsula.

The set of Swedish fringe of settlement maps have been prepared and reduced to publication size. These are maps showing: fringe of settlement railroads, fringe of settlement roads, and fringe of settlement zones. The southern regional limit on each must be changed (see C_1 above) and the maps rephotographed.

The Västernorrland sample strip base maps have been printed (see attached). These are two sheets, about 1/500 thousand scale with commune and parish boundaries in black, unsettled areas (same as D.1.a. above) in blue stippling, and commune centers and parish churches in blue symbols with the initial letters of their names in blue. Position of the stippling is dependable.

The inhabited areas of Finland map, based on the two Finnish maps attached, is ready for photographic reduction to publication size.

3. Manuscript Maps Completed.

The Finnish fringe of settlement maps showing railroads and roads, classified as to inter-regional or local transport lines, are complete. The zonal classification is tentatively complete (Fig. 1a) and will be finished when the

boundary between the inner and outermost fringe zones is established more certainly.

The Canadian Prairie Provinces agricultural fringe mobility map (for 1931-1951) has been completed. Classification of the fringe between 1931 and 1951 is on the basis of: major retreat, minor retreat, stability, minor advance, major advance.

A 1/500,000 population map of Iceland, originally prepared for the principal investigator by [illegible], has been revised and areas of abandonment of settlement have been outlined on it.

4. Ground Photography (Three Year report)

During the field seasons of 1958, 1959, and 1960 approximately 1000 Kodachrome slides each were taken in Norway, Sweden, and Finland. These, combined with photography taken in 1955-56 (during Fulbright program sponsorship), make approximate total photographic coverage: 150 in Iceland, 1400 in Norway, 1300 in Sweden, and 1250 in Finland.

5. Aerial Photography (Three Year report)

Vertical air photos, of recent date and with varying scales, have been obtained for about 25 Norwegian areas from near the southern end of the Norwegian-Swedish border to the Norwegian-Soviet border in the north. The areas of coverage are representative of various degrees of growth of settlement since 1920.

Swedish vertical air photos, taken in 1957 and with a scale of 1/30,000 have been purchased for all of the [illegible] sample strip (Fig. 2) excepting the near-vicinity of the coast.

D. Field Work Completed

1. Finland

Field observation in Finland was done between 1 July and 21 August, 1960. There were two phases: 1) reconnaissance across the continuous/discontinuous settlement boundary and 2) detailed observations in six new colonies in northern Finland and three areas of new settlement in the east-central part of the country (Fig. 1). Much of the work was done with the guidance of national and local Ministry of Colonization officials.

2. Sweden

The Swedish research period extended from about 8 June to the end of August, 1960. Reconnaissance was carried out in Middle and northern Sweden but the main effort was centered on detailed work on abandonment of settlement in the Västerbotten sample strip, paralleling a more southerly strip worked during the summer of 1959 (Fig. 2). The research again was carried out by way of provincial and local officials of Lantbruksnämnden (provincial agricultural committee).

3. Switzerland

The Intergovernmental Committee for European Migration was visited in Geneva. Most of the time was spent in the office of the Director of Land Settlement, Dr. H. Weismann, studying and procuring information on new settlement activities throughout the world, especially in Latin America.

(Mr. Jonkers, at the International Labor Office, has been compiling recent settlement experience throughout the world, with emphasis on the less successful. He was not in Geneva at the time of the principal investigator's visit; his compilation is a basic reference to be seen as soon as possible).

4. The Netherlands

At The Hague is the Research Group for European Migration Problems which has assembled much data on settlement experience throughout the world. Dr. G. Beijer has forwarded a great deal of information on these experiences and on settlement planning in general as a result of meeting the principal investigator; the Group's bibliography on settlement is probably the most complete and up to date in the world and should be reviewed in detail.

Contact was established with the International Institute for Land Reclamation and Improvement in Wageningen. Dr. C.A.P. Takes made available and has been forwarding several documents with data on general settlement planning procedures. Dr. Karl Bienheim of the Technion Institute in Israel was also at the Institute and has been forwarding manuscript material related to general settlement planning and Israeli experiences.

E. Other Project Activities

1. Final Report

The principal activity now is the *preparation of the final report*. The tentative organization is:

Foreword

Part I, Settlement in Northern North America

Inheirited Concepts of Settlement
Recent Changes of Settlement
Bases of Future Settlement Possibilities

Part II, The Fringe of Settlement Zones (for comparability)

Norden
  Finland
  Norway
  Sweden
  Iceland

Northern North America
  Canada
  Alaska

Part III, The Transfer of Settlement Experience: Physical

Basic governmental action (philosophic, legal,
Administration   demographic, military)
Financing
Selection of the land (incl. transport)
Selection of the Settlers
Clearing and construction
Distribution and unit sizes of land parcels
Distribution of settlers
Tenure arrangements
Provision for group activities
Provision for services

Part IV, The Transfer of Settlement Experience, Timing

In the general national development
In a fringe of settlement zone
In a locality

2. Publication

Swedish Fringes of Settlement, *XIXth Intern. Geographical Union, Abstracts of Papers*, Stockholm, 1960, pp. 280-281.

Swedish Fringes of Settlement (abstract), *Annals of the Association of American Geographers*, v. 50, 1960, p. [illegible].

Annotated Selected Bibliography of Scandinavian References, Madison, Wis., 1960, litho., (see attached). Authored by the Bibliography Unit of the Arctic Institute of North America and the principal investigator.

Progress Report during Third Year of Project on High Latitude Fringes of Settlement, *NR 389:127*, Madison, May 1960, 6 pp, & 2 maps, reproduced.

Field Activity Report for Summer of 1960, *NR 389:127*, Madison, Oct. 1960, 12pp., reproduced

Semi-annual Report for Third Year of Project on High Latitude Fringes of Settlement, *NR 389:127*, Madison, Oct. 1960, 6pp. & 4 maps, reproduced

World Air Photo Cover, 1958, in Amer. Soc. of Photogrammetry, *Manual of Photographic Interpretation*, Washington, 1960, Chap. 2.

World Air Photo Cover, 1959, submitted for publication to *Surveying and Mapping* and *The Professional Geographer*.

Arrangements have been unsuccessful for the translation and publication of Dr. A. Løddesøl's book on Norwegian bog development. The Norwegian author's and publisher's releases have been obtained and a translator tentatively obtained; however, a pre-translation assessment was made incorrectly and has stopped progress on the work. Canadian specialists are still inquiring about the work and we are certain that it would be of great value to Canadian and United States' scientists; however, without the proper pre-translation assessment we can not proceed and it is felt that the final report takes precedence over other efforts.

3. Scandinavian Symposium.

In April 1960 a Symposium on Norden (the Scandinavian States and Finland) was presented at the annual meetings of the Association of American Geographers in Dallas, Texas. It was sponsored by the Geography Branch, Office of Naval Research and arranged by the principal investigator; details are given in footnote 3, page 1, of the attached *Annotated Selected Bibliography of Scandinavian References*.

4. International Geographical Union Meetings.

The principal investigator was invited to join the pre-congress symposium on advance and retreat of settlement in the Swedish Bergslag region. He participated by reading the paper on Swedish Fringes of Settlement originally prepared for the Dallas, Texas meetings and by chairing the summary discussion period. In addition, all members of the project attended the Stockholm meetings of the Congress to participate in discussions and meetings and to become acquainted with other professional colleagues with similar interests.

5. Finnish Fringes of Settlement Paper.

It is proposed to prepare a paper on Finnish fringes of settlement zones for delivery at the annual meetings of the Association of American Geographers in August 1961. This paper will parallel those given on Norway in 1959 and Sweden in 1960 to the same association.

9. Assistants on the Project (Three Year report)

The training phase of the project, amounting to about 30 per cent of its time, was completed at the close of the 1960 field season. During the past three years of this phase eight graduate students have been trained in the office portions of fringe settlement analysis and six have been trained in field research on the subject.

The principal investigator commends these eight men for their loyalty to the work during its philosophical, compilation, and creative stages. Many times unselfish effort was required during unpleasant conditions and every one produced at his maximum; the principal investigator is proud of those colleagues for their past efforts and present work.

1. 1957-1958

   Academic year:
   Fil. Mag. Gunnar Norling; Swedish; from Uppsala University, Sweden; now assistant in the Department of Geography at that institution and doing advanced research on population in the southern part of northern Sweden.
   Welburn K. Johnson; American; now editor in McGraw-Hill Publishing Company, N. Y. C.

   Summer 1959, Field work in Norway:
   Norling and Johnson.

2. 1958-1959

   Academic year:
   Melvin Aamodt; American; now instructing in geography in Utah.
   Fil. Mag. Kurt-Viking Abrahamsson; Finnish; from the University of Helsinki; now assistant in the Department of Geography at that institution and doing advanced research on population abandonment in the Åland Islands of southwestern Finland.
   Philip D. Keddie; Canadian; from University of Manitoba; now assistant in the Department of Geography at the University of Wisconsin and doing advanced research on the historical geography of Canadian fringe settlement.

   Summer 1960, Field Work in Sweden:
   Abrahamsson.

3. 1959-1960

   Academic year:
   Fil. Mag. Hans Aldskogius; Swedish; from Uppsala University, Sweden; now assistant in the Department of Geography at that institution and preparing for advanced research on a phase of Swedish population.

J. R. Gibson; Canadian; from the Universities of British Columbia and Oregon; now Canada Council Fellow at the Department of Geography in the University of Wisconsin for advanced research on a phase of the historical geography of the U.S.S.R.

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Summer 1960, Field work in Finland:
Aldskogius

Summer 1960, Field work in Sweden:
Gibson and Wolpert

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Respectfully submitted,

Kirk H. Stone

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Professor of Geography and
Principal Investigator

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